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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification ⁶ : A61K 9/127, C12N 15/11	A3	(11) International Publication Number: WO 97/07784 (43) International Publication Date: 6 March 1997 (06.03.97)
(21) International Application Number: PCT/US96/14146 (22) International Filing Date: 26 August 1996 (26.08.96) (30) Priority Data: 08/520,385 29 August 1995 (29.08.95) US (71) Applicant: BOARD OF REGENTS, THE UNIVERSITY OF TEXAS SYSTEM [US/US]; 201 West 7th Street, Austin, TX 78701 (US). (72) Inventors: LOPEZ-BERESTEIN, Gabriel; 5630 Rutherglenn, Houston, TX 77096 (US). TARI, Ana, Maria; 16 Charleston Park Drive #1703, Houston, TX 77025 (US). (74) Agent: GOODMAN, Kenneth, D.; Arnold, White & Durkee, P.O. Box 4433, Houston, TX 77210 (US).		(81) Designated States: AL, AM, AT, AU, BB, BG, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (KE, LS, MW, SD, SZ, UG), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG). Published <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> (88) Date of publication of the international search report: 24 April 1997 (24.04.97)
(54) Title: LIPOSOMAL PHOSPHODIESTER, PHOSPHOROTHIOATE, AND p-ETHOXY OLIGONUCLEOTIDES		
(57) Abstract An improved delivery system for antisense oligonucleotides involves a liposomal composition, comprising a liposome which consists essentially of neutral phospholipids and an antisense oligonucleotide that is entrapped in the liposome and is selected from the group consisting of phosphodiester oligonucleotides, phosphorothioate oligonucleotides, and p-ethoxy oligonucleotides.		

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 96/14146

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A61K9/127 C12N15/11

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A61K

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 41 10 085 A (BOEHRINGER INGELHEIM INTERNATIONAL GMBH) 1 October 1992 see page 2, line 65 - page 3, line 20 see page 23, line 37 - line 48 ---	1,2
Y	WO 95 03788 A (BOARD OF REGENTS, THE UNIVERSITY OF TEXAS SYSTEM) 9 February 1995 see page 8, line 8 - page 11, line 31 --- -/--	1-4,6, 10-12

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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* "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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* "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

* "A" document member of the same patent family.

Date of the actual completion of the international search

10 March 1997

Date of mailing of the international search report

14.03.97

Name and mailing address of the ISA
European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax (+ 31-70) 340-3016

Authorized officer

Benz, K

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 96/14146

C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>NUCLEIC ACIDS RESEARCH, vol. 19, no. 20, 25 October 1991, EYNHAM ,OXFORD (GB), pages 5551-5559, XP002027215 S. AKHTAR ET AL.: "interactions of antisense DNA oligonucleotide analogs with phospholipid membranes (liposomes) " see the whole document see page 5553; table 1 ---</p>	<p>1-4,6, 10-12</p>
Y	<p>SCIENCE, vol. 261, no. 5124, 20 August 1993, WASHINGTON (US), pages 1004-1012, XP002027216 C.A. STEIN ET AL. : "antisense oligonucleotides as therapeutic agents-is the bullet really magical" see page 1005, column 1; figure 1 -----</p>	<p>1-4,6, 10-12</p>

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 96/14146

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
Remark: Although claim(s) 10
is(are) directed to a method of treatment of the human/animal
body, the search has been carried out and based on the alleged
effects of the compound/composition.
2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such
an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all
searchable claims.
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of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report
covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is
restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/US 96/14146

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 4110085 A	01-10-92	NONE	
WD 9503788 A	09-02-95	US 5417978 A	23-05-95
		AU 7407994 A	28-02-95
		CA 2168243 A	09-02-95
		EP 0711149 A	15-05-96
		JP 9501160 T	04-02-97